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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No. 13477

First Inventor Obitz

Title FEEDING APPARATUS...MATER

Express Mail Label No.

Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ Fee Transmittal Form (e.g., PTO/SB/17)
(Submit on original and a duplicate for fee processing)
2. ☒ Applicant claims small entity status. **Unsigned**
See 37 CFR 1.72.
3. ☒ Specification **[Total Pages 3]**
(preferred arrangement set forth below)
- Descriptive title of the invention
- Cross Reference to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to sequence listing, a table, or a computer program listing appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure
4. ☒ Drawing(s) (35 U.S.C. 113) **[Total Sheets 2]**
5. Oath or Declaration **Unsigned Total Pages 2**
- a. ☐ Newly executed (original or copy)
b. ☐ Copy from a prior application (37 CFR 1.63 (d))
(for continuation/divisional with Box 17 completed)
- i. ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b)
6. ☐ Application Data Sheet. See 37 CFR 1.76

7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)
8. Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
- a. ☐ Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
i. ☐ CD-ROM or CD-R (2 copies); or
ii. ☐ paper
- c. ☐ Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement ☐ Power of Attorney
(when there is an assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure ☐ Copies of IDS
Statement (IDS)/PTO-1449 Citations
13. ☒ Preliminary Amendment *for calculations*
14. ☒ Return Receipt Postcard (MPEP 503) *FILE*
(Should be specifically itemized)
15. ☒ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP)

of prior application No. _____

Prior application information

Examiner _____

Group / Art Unit _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

18. CORRESPONDENCE ADDRESS

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Signature				Date	9/21/2000

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
In re U.S. Patent Application) Attn:
of)
Int'l Filing Date: 9/21/2000) Group Art Unit:
Inventor: Lars Obitz) Examiner:
For: FEEDING APPARATUS FOR) Attorney Docket: 13477
CELLULOSIC MATERIAL)
) Arlington, Virginia
) September 21, 2000

Honorable Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

PTO CUSTOMER NO. 000293

PRELIMINARY AMENDMENT FOR PURPOSES OF CALCULATING FILING FEES

Please amend the claims of the above referenced U.S. Patent
Application as follows:

Claim 4, delete ", 2 or 3".

Claim 5, delete "any of the claims 1-4," and insert --claim
1--.

Claim 6, delete "or 5".

Claim 7, delete "any of the claims 2-6," and insert --claim
2--.

Claim 8, delete "any of the claims 4-7," and insert --claim
4--.

REMARKS

This amendment is being made to remove the multiple
dependency of claims 4-8 thereby reducing the filing fees. No new
matter has been added.

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Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	

Feeding apparatus for cellulosic material

The present invention concerns a feeding apparatus for cellulosic material in which a screw feeds the material towards a counterstay for the build-up of a pressure-tight material plug.

In treatment of cellulosic material, such as refining in a grinding apparatus, steam is formed, which is separated from the material, retaining its high pressure, to be utilized separately in the process. However, discharge of the material separated from the steam is done at a lower pressure, such as atmospheric pressure. In order to prevent the steam from leaving with the material and to maintain the high pressure of the steam, the material must be fed out through sluice means of any kind. Another way to seal the steam separating portion from the discharge of the material is to allow the material at the discharge to form a pulp plug, which seals the outlet so that the steam will not be entrained in the material when discharged.

In known outlet means of the latter type, the material is provided to fall down into a screw, which is, in one end, provided with drive means and in the opposite end feeds the material towards a throttling opening so that the material plug is formed. Since the driving is provided on the pressure side, the drive means must be sealed by means of pack boxes or the like, which wear out and require maintenance and possibly replacing. The plug is also formed in the end of the relatively long screw, which is opposite to the drive means, wherefore the higher load on this end of the screw makes the screw unstable. This also limits the possibilities to control the forming of the plug depending on the loading conditions.

The main object of the invention is to provide a feeding apparatus in which the drawbacks of the known apparatuses are eliminated.

This object is met by giving the apparatus the features of the following claims.

The present invention will in the following be described in more detail in connection with an example of embodiment shown in the drawings.

Figure 1 shows a side view, partly in cross section, of a feeding apparatus according to the invention.

Figure 2 shows in an enlarged scale a detail of the encircled portion of the apparatus of fig. 1.

The apparatus comprises a connection piece 10 which by a flange 12 is pressuretight connected to the outlet of a steam separator, for example of the type shown in the Swedish patent 9101342-5 (corresponding to US patent 5148998), so that the material, such as pulp, is fed to the connection piece 10 when the steam generated during the refining has been separated in the steam separator and under pressure passed to different uses in the process, such as heating of water. In order to prevent decreasing or vanishing of the pressure of the steam, the pulp must after the steam separating step be fed out in an pressure-tight way. For this, the pulp falls down into a sealed house 14, provided under the connection piece 10, in which house 14 a transporter screw 16 with flights 18 provided on a shaft 20 is journaled. The shaft 20 has a conically increasing diameter towards the outlet end of the screw 16, i.e. in the direction of

the feeding of the material transported by the screw 16 to direct the material out towards the inner periphery of the house. At the outlet end the shaft 20 is further provided with a flange 22, which has a conically increasing diameter in said feeding direction. Around this flange 22 is a plug pipe 24 provided, which is movably journaled in the house 14 and which at one end is displaceably journaled around the outside of the house 14 by means of a spline connection 26, which is bolted to the house, so that the plug pipe may be displaced towards and away from the flange 22 for forming, together with this, an outlet gap 28 for the material. The displacement is carried out by operating rods 30 connected to the plug pipe 24 and which are operated by suitable drive motors (not shown) to displace the plug pipe in a preferred direction and in this way change the size of the gap 28.

The operating rods 30 are controlled and mounted in openings in a bearing house 42 for the shaft of the screw. In the gap 28 a controllable counter pressure against the feeding of the material occurs in this way, which makes provisions for forming a material plug 40 before the flange 22, which material plug 40 seals the interior of the house 14 from the space 34 outside of the flange 22. On the outside of the flange 22, seen in the direction of the feeding, wings 32 are provided, which are provided to cut up the annular material plug which is fed out of the gap 28 to the space 34, so that the material falls down to the bottom of the space 34. This bottom is open downwards and provided with a connection piece 36 intended for connection to any means for further transport of the material. A distance from and opposite the outlet gap 28 the space 34 is limited by a sealing wall 38, which sealingly surrounds an extension 44 of the shaft 20, which shaft extension 44 is journaled in the

bearing house 42 and is provided to be connected to a drive motor (not shown) for the screw 16. The space 34 has a connection piece 46 at the top, which is provided with an inspection cover 48.

The described apparatus works in the following way: The pulp, which comes from the steam separator (not shown) to the inlet 12, falls down into and is fed by the screw 16 towards the outlet of the house 14, i.e. in the left hand direction in fig. 1, and will be forced by the conically increasing axle 20 towards the inner periphery of the house 14 so that a pulp plug 40 will be formed before the pulp outlet, which is limited by the flange 22 provided on the axle 20. To control the discharge of the pulp plug 40 and thus retaining the pressure-tight function of the plug 40, the size of the outlet opening 28 is controlled according to the invention by means of the, at the inner periphery of the house 14, journaled plug pipe 24, of which the motion is controlled by the operating rods 30. The annular pulp plug discharged through the opening 28 will, if it is not falling apart by itself, be beaten apart by wings 32 provided on the outside of the opening 28 and rotating with the shaft 20. The pulp then falls down into the lower portion of the house 34 and is fed out of the outlet 36 for further processing.

As is evident from the shown embodiment, the shaft 20 of the screw 16 is journaled with its shaft extension 44 in the bearing house 42, on the side of the house 14 of the screw 16 where there is atmospheric pressure. In this way there is not any need for pressure-tight pack boxes in the bearing house, which simplifies and reduces the costs for maintenance and operation of the apparatus. By the fact that the bearing 42 of the screw 16 is closest to the end of the screw 16 where the pulp plug 40 is

formed unstability of the screw 16 is prevented to a great extent so that better precision is achieved when setting the size of the outlet opening.

CLAIMS

1. A feeding apparatus for cellulosic material comprising a screw (16), which feeds said material towards an counterstay for forming a pressuretight material plug, **characterized in** that said screw (16) comprises a periphery portion (22), which together with throttle means (24) provided around said portion, in the house (14) of the apparatus, forms an opening (28) through which said material leaves said screw while forming a pressure-tight material plug (40).
2. The apparatus according to claim 1, **characterized in** that said throttle means comprises a plug pipe (24), which is displaceably journaled (26) in said house (14) so that it may be brought towards or away from said periphery portion (22) of said screw (16) to control the size of the opening (28).
3. The apparatus according to claim 2, **characterized in** that said displaceable bearing of the plug pipe (24) is formed by a spline connection between said plug pipe, at the end of the screw which is opposite said periphery portion (22), and the inner surface of the house (14).
4. The apparatus according to claim 1, 2 or 3 **characterized in** that the shaft (20, 44) of the screw (16) is journaled in a bearing house (42) outside of the house (14).
5. The apparatus according to any of the claims 1-4, **characterized in** that the bearing house (42) is provided at the outlet end of the screw (16).
6. The apparatus according to claim 4 or 5 **characterized in** that

said bearing house (42) is provided at a distance from the house (14), whereby said distance forms a discharge space (34) for the pulp.

7. The apparatus according to any of the claims 2-6, **characterized in** that wings (32) are provided on the shaft (20) of the screw (16) outside of and adjacent to the opening (28) for breaking up of the discharged material plug (40).

8. The apparatus according to any of the claims 4-7, **characterized in** that the displacement of the plug pipe (24) is carried out by means of operating rods (30) mounted in the bearing house (42).

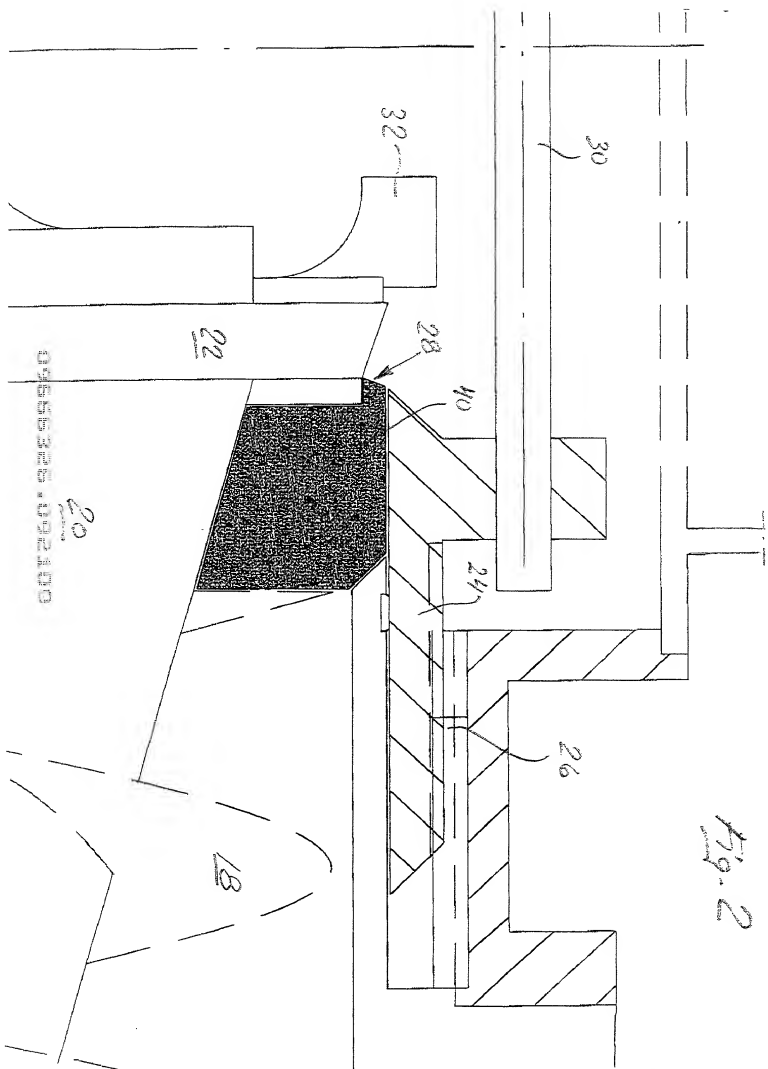
ORIGINAL DOCUMENT

ABSTRACT

An apparatus for pressuretight discharge of refiner material, for example cellulosic material by using a screw (16), which feeds the material towards an counterstay whereby an pressure-tight material plug is formed at the outlet of the screw.

The screw (16) is at the outlet end provided with, a portion (22), which together with throttle means (24) journalled around said portion in the house (14) of the apparatus forms an outlet opening (28) through which said material is fed out by the screw while forming a pressuretight material plug (40).

Fig. 2



09655326.092100

DECLARATION AND POWER OF ATTORNEY
PATENT APPLICATION

ATTORNEY'S DOCKET NO. 13477

As below named inventor, I hereby declare that:

My residence, post office address and citizenship is as stated below next to my name.

I verily believe I am the original, first and sole or joint inventor (if plural, inventors are named below) of the invention entitled:

FEEDING APPARATUS FOR CELLULOSIC MATERIAL

the specifications and drawings of which

(check one) ☒ is attached hereto.

☐ was filed on _____ as
Application Serial No. _____
was amended on _____
(if applicable)

I hereby state that I have reviewed and understood the contents of the above identified specification and drawings, including the claims.

I acknowledge the duty to disclose information which is known to be material to the examination of this application to the Patent Office in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby state that I do not know and do not believe that the invention which is the content of the above specification, claims and drawings was ever known or used in the United States of America before my invention thereof, or the patented or described in any printed publication in any country before my invention thereof or more than one (1) year prior to this application, that the same was not in public use or on sale in the United States of America more than one (1) year prior to this application, that the invention has not been patented or made the subject of the inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve (12) months prior to this application; and as to applications for patents or inventor's certificate on the invention filed in any country foreign to the United States of America prior to this application by me or my legal representative or assigns.

☐ no such applications have been filed, or

☒ such applications have been filed as follows:

EARLIEST FOREIGN APPLICATION(S), IF ANY, FILED WITHIN 12 MONTHS PRIOR TO THIS APPLICATION

COUNTRY CLAIMED	APPLICATION NO.	DATE OF FILING (DAY, MO., YR.)	DATE OF ISSUE (DAY, MO., YR.)	PRIORITY UNDER 35 USC 119
Sweden	9903448-0	23 Sept. 1999		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
				YES <input type="checkbox"/> NO <input type="checkbox"/>

ALL FOREIGN APPLICATIONS, IF ANY, FILED MORE THAN 12 MONTHS PRIOR TO THIS APPLICATION

POWER OF ATTORNEY: I, As a named inventor, I hereby appoint the attorney(s) and/or agent(s) listed below to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.
The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from Bengt Sedvall as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the person's from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

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	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
202	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
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203	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE	DATE	DATE